The Role of Hematology in Diagnosing and Treating Alzheimer's Disease.

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Purpose of Study

The purpose of this study is to review and describe various factors and biomarkers which relate to the onset and progression of Alzheimer's disease and review the current literature on those biomarkers.

Hypothesis

I hypothesize that researchers studying biomarkers of Alzheimer's disease will find correlations between cerebrospinal fluid, amyloid βeta and tau proteins.

Abstract

This study focuses on biomarkers and related factors associated directly or indirectly with Alzheimer's disease. Fluid biomarkers, inflammatory biomarkers and various imaging technologies are considered. Amyloid βeta protein and tau protein are the two major factors linked either causally or diagnostically with Alzheimer's. Concentrations of these two proteins in blood and cerebrospinal fluid are evaluated for correlations to Alzheimer's disease onset and progression and are being studied to determine whether they act independently or interact in some manner. Amyloid βeta detected in plasma shows little or no correlation with Alzheimer's progression, whereas, tau protein detected in cerebrospinal fluid correlates with Alzheimer's disease. Current literature has been reviewed for the detection, characterization and correlation of various biomarkers with Alzheimer's disease.

Methods

- A pool of 50-60 articles was taken from 6 journals (Neuro-Image Clinic, Neurobiology of Aging, PLoS Medicine, Journal of the Neurological Sciences, Journal of Cerebral Blood flow and Metabolism, and NIH-PA) that report on Alzheimer's disease from 2009 to present.
- 23 of these articles address the hematologic factors associated with Alzheimer's disease and used for statistical data analyses.
- Excel 2013 was used to compare each article's use of biomarkers and the year in which these articles were published.
- JMP file computed the p-value in chi-square, using categorical analysis that compares the likelihood of Aβ proteins and tau proteins being considered along with studies of Cerebrospinal Fluid (CSF).

Results

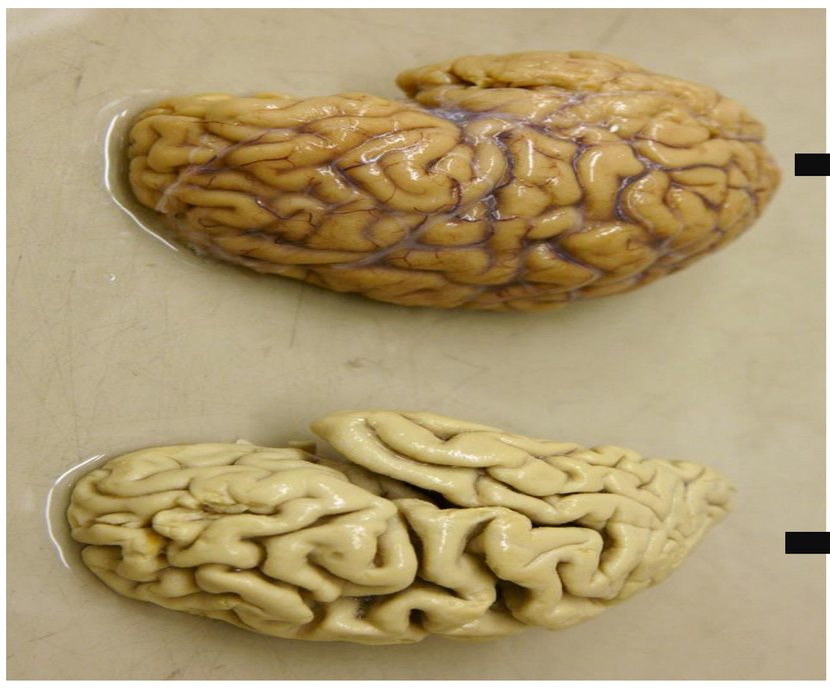
Response	CSF	Aligned Responses	Responses	Sample
Aβ 40	N		13	
Aβ 40	Y		10	
Aβ 42	N		13	
Aβ 42	Y		10	
Tau	N		13	
Tau	Y		10	
P-tua	N		13	
P-tua	Y		10	

N
Y

Categorical Analysis
Responses of Aβ and tau proteins in relation to CSF ($p<0.01$).

Conclusion

The enhanced capacity to detect and characterize biomarkers relating to Alzheimer's disease provides more effective diagnostic and therapeutic measures to either stop the advance of, or potentially cure Alzheimer's disease.



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